

DRAFT - Designation of 24-Hour PM_{2.5} Nonattainment Areas

Introduction

The United States Environmental Protection Agency (USEPA) designated nonattainment areas for the annual PM_{2.5} standard in December 2004. New Jersey is part of two nonattainment areas: The Philadelphia-Wilmington (Pa-NJ-DE) nonattainment area that include New Jersey counties of Burlington, Camden and Gloucester; and the New York-New Jersey-Long Island, NY (NY-NJ-CT) nonattainment area that includes the New Jersey counties of Bergen, Essex, Hudson, Mercer, Middlesex, Monmouth, Morris, Passaic, Somerset and Union.

The USEPA adopted a new annual and 24-hour standard in 2006. The annual standard remains the same. The USEPA issued guidance for determining the boundaries of 24-hour fine particle nonattainment areas on June 8, 2007. The factors to be used for determining attainment areas are essentially the same as those used for designating annual PM_{2.5} nonattainment areas in 2004, with the exception that urban nonattainment areas do not need to be based on US Office of Management and Budget boundaries as required by the 2006 PM_{2.5} annual guidance. An evaluation of the nine factors, by nonattainment area is included below.

For additional info see www.epa.gov/pmdesignations

Analysis of the New Jersey portion of the PA-NJ-DE PM_{2.5} 24-hour standard nonattainment area.

The New Jersey portion of this area includes the counties of Gloucester, Camden, and Burlington.

The following is a brief summary of the nine factors for Southern New Jersey's regional air quality. Data is presented for the counties in the current annual PM_{2.5} nonattainment area and the adjacent counties.

New Jersey's Recommendations

Factor 1: Air Quality Data

The air quality analysis is an examination of PM_{2.5} air quality monitoring data, including the daily design value calculated for each monitor based on air quality data for a 3-year period.

The only violating monitors (based on 2004-2006 design value data) for NJ is in Camden County.

County	PM_{2.5} 2004- 2006 Design Value (µg/m³)
New Castle, DE	37
Kent, DE	32
Philadelphia, PA	36
Delaware, PA	35
Montgomery, PA	32.4
Chester, PA	34.9
Bucks, PA	33
Northampton, PA	37
Berks, PA	36
Lancaster, PA	39
Lehigh, PA	No longer have a monitor
Gloucester, NJ	28.5
Camden, NJ	37
Burlington, NJ	No monitor
Atlantic, NJ	30.1
Mercer, NJ	34
Monmouth, NJ	No monitor
Ocean, NJ	31
Hunterdon, NJ	No monitor
Cumberland, NJ	No monitor
Salem, NJ	No monitor

The 24-hour PM_{2.5} standard is 35 µg/m³.

Factor 2: Emissions in the PA-NJ-DE nonattainment area and adjacent counties.

The following table shows total emissions (in tons per year) for Delaware, Pennsylvania, New Jersey, and Maryland counties included in the PA-NJ-DE PM_{2.5} annual nonattainment area and adjacent counties. (Data source: 2002 MANE-VU Modeling Inventory).

County	2002 PM _{2.5} (tons)	Proj 2009 PM _{2.5} (tons)	02-09 % change	2002 SO ₂ (tons)	Proj 2009 SO ₂ (tons)	02-09 % change	2002 NO _x (tons)	Proj 2009 NO _x (tons)	02-09 % change
New Castle, DE	3,818	3,130	-18	50,140	12,000	-76	31,544	23,104	-27
Kent, DE	1,164	1,115	-4	4,029	2,201	-45	10,336	8,554	-17
Philadelphia, PA	2,681	2,716	1	9,504	6,892	-27	31,157	2,4315	-22
Delaware, PA	2,022	2,442	21	16,074	8,311	-48	23,838	2,0642	-13
Montgomery, PA	2,851	2,831	-1	5,172	4,828	-7	25,341	17,906	-29
Chester, PA	2,279	2,324	2	5,511	3,719	-33	18,779	13,642	-27
Northampton, PA	2,996	6,340	112	58,797	39,973	-32	24,518	6,340	-74
Berks, PA	2,833	3,949	39	17,593	12,843	-27	22,221	15,638	-30
Lancaster, PA	3,736	3,927	5	3,980	3,522	-12	20,045	13,941	-30
Lehigh, PA	1,511	1,568	4	3,762	3,796	1	14,525	9,589	-34
Bucks, PA	2,170	2,158	-1	3,837	3,588	-6	20,195	14,400	-29
Gloucester, NJ	1,303	1,462	12	7,169	3,476	-52	14,515	9,494	-35
Camden, NJ	1,289	1,157	-10	1,908	922	-52	15,372	9,201	-40
Burlington, NJ	1,893	1,717	-9	3,429	1,314	-62	18,522	12,233	-34
Atlantic, NJ	1,010	926	-8	880	638	-28	8,331	5,719	-31
Cumberland, NJ	871	863	-1	3,216	2,452	-24	6,971	5,919	-15
Salem, NJ	750	1,033	38	5,451	5,420	-1	6,622	4,964	-25
Mercer, NJ	1,236	1,653	34	15,508	4,270	-72	25,520	9,957	-61
Monmouth, NJ	1,640	1,481	-10	1,669	810	-51	17,925	11,291	-37
Ocean, NJ	2,256	2,023	-10	1,074	762	-29	10,421	7,300	-30
Warren, NJ	1,031	958	-7	565	464	-18	5,250	3,065	-42
Hunterdon, NJ	1,168	1,047	-10	613	434	-29	6,613	3,942	-40
Cecil, MD	908	896	-1	639	502	-21	5,037	2,841	-44
Kent, MD	506	546	8	385	272	-29	1,212	932	-23

Gloucester, Camden, Burlington, and Salem counties in New Jersey have multiple large point sources, which are concentrated along the border of Philadelphia, Delaware and New Castle Counties. In contrast, Ocean and Atlantic counties do not have any significant point sources.

Factor 3: Population/ Population density

County	2006 Population	2006 Population Density (population per sq mi)
New Castle, DE	525,587	1,174
Kent, DE	147,601	215
Philadelphia PA	1,448,394	10,000
Delaware, PA	555,996	2,994
Montgomery PA	775,688	1,553
Chester, PA	482,112	573
Bucks, PA	623,205	985
Northampton, PA	291,306	714
Berks, PA	401,149	435
Lancaster, PA	494,486	496
Lehigh, PA	335,544	899
Gloucester, NJ	282,031	784
Camden, NJ	517,001	2,293
Burlington, NJ	450,627	526
Ocean, NJ	562,335	803
Atlantic, NJ	271,620	450
Mercer, NJ	367,605	1,552
Monmouth, NJ	635,285	1,304
Cumberland, NJ	154,823	300
Salem, NJ	66,595	190
Cecil, MD	99,506	247

U.S. Census Bureau, 2006 Population Estimates, Census 2000, 1990 Census

Due to its large concentrated population and land size area, the county of Philadelphia has the most population and the highest population density indicates the likelihood of population-based emissions to contribute to monitored violations.

To a much lesser extent, Camden County is also more urbanized than the majority of the remaining counties in the PA-NJ-DE nonattainment area and adjacent counties.

The population of Gloucester, Camden, and Burlington are concentrated along the border of Philadelphia and Delaware counties. In contrast, the population of Ocean County is concentrated in the northeastern most section of the county.

Factor 4: Traffic and commuting patterns

County	VMT (Millions)	#Commuters to Philadelphia County, PA	#Commuters to Delaware County, PA	#Commuters to New Castle County, DE
New Castle, DE	5674.40	5,386	8,150	209,742
Kent, DE	1435.19	37	125	6,058
Philadelphia, PA	6499.46	429,667	21,802	1,856
Delaware, PA	4011.36	48,151	137,988	9,002
Montgomery, PA	7526.57	54,576	11,758	1,201
Chester, PA	4414.36	10,568	17,870	12,976
Bucks, PA	5249.59	31,892	2,754	493
Northampton, PA	2399.15	244	66	16
Berks, PA	3320.25	702	505	157
Lancaster, PA	4391.88	607	615	523
Lehigh, PA	3374.14	578	171	22
Gloucester, NJ	2621.22	13,778	3,179	1,662
Camden, NJ	4668.91	32,961	3,232	1,286
Burlington, NJ	4901.56	17,661	1,771	597
Ocean, NJ	3366.62	491	118	45
Atlantic, NJ	3234.23	1,359	314	175
Monmouth, NJ	6229.76	622	66	40
Mercer, NJ	2667.73	1,574	244	139
Cumberland, NJ	1264.16	618	105	171
Salem, NJ	1012.51	615	486	3,258
Cecil, MD	1192.63	254	373	14,059

The total Vehicle Miles Traveled (VMT) for 2005 is provided for each county in millions of miles.

The analysis of this factor looks at the number of commuters who drive to counties within the metropolitan area with violating monitors, as well as total Vehicle Miles Traveled (VMT) for each county in thousands of miles.

The largest numbers of commuters are from Pennsylvania and Delaware Counties. Camden, Burlington, and Gloucester Counties also have large numbers of people who commute to Philadelphia. All other New Jersey counties are low for the number of commuters.

After Philadelphia, there does not appear to be a significant difference in VMT among the remainder of the counties in the nonattainment area or adjacent counties.

Factor 5: Expected growth

County	2005 Population	2006 Population	% Growth 2005-2006
New Castle, DE	522,094	525,587	0.7
Kent, DE	143,462	147,601	2.9
Philadelphia, PA	1,456,350	1,448,394	1
Delaware, PA	554,393	555,996	5
Montgomery, PA	774,666	775,688	3
Chester, PA	473,723	482,112	7
Bucks, PA	619,772	623,205	4
Northampton, PA	287,334	291,306	13
Berks, PA	396,236	401,149	9
Lancaster, PA	489,936	494,486	6
Lehigh, PA	330,168	335,544	11
Gloucester, NJ	277,037	282,031	1.8
Camden, NJ	515,381	517,001	0.3
Burlington, NJ	449,148	450,627	0.3
Ocean, NJ	558,170	562,335	0.7
Atlantic, NJ	270,318	271,620	0.5
Monmouth, NJ	634,841	635,285	0.1
Mercer, NJ	366,070	367,605	0.4
Cumberland, NJ	152,905	154,823	1.3
Salem, NJ	66,054	66,595	0.8

Camden, Gloucester, and Burlington Counties experienced low to moderate growth in New Jersey.

Factor 6: Meteorology

The prevailing wind direction to counties with violating monitors is predominantly from the NW and SW.

County	Prevailing Wind Direction %			
	NW	SW	SE	NE
Philadelphia, PA	35	31	15	20
Delaware, PA	35	30	15	20
New Castle, DE	38	28	15	19

Factor 7: Geography/topography

The area does not have any geographical or topographical boundaries limiting its airshed in the areas.

Factor 8: Jurisdictional boundaries

The current jurisdictional boundaries for the annual PM_{2.5} nonattainment area are adequate for the 24-hour PM_{2.5} nonattainment area. The area includes Gloucester, Camden, and Burlington Counties in New Jersey, Bucks, Montgomery, Chester, Philadelphia Counties in Pennsylvania and New Castle County in Delaware.

Factor 9: Level of control of emission sources

This factor did not play a significant role in the decision making. The level of control of emissions is reflected in factor 1.

Emissions of direct PM_{2.5}, NO_x, and SO₂ will continue to decrease in the future because the implementation of the Clean Air Interstate Rule and additional rules regulating the emissions of NO_x and VOCs that the New Jersey Department of Environmental Protection is planning to propose in 2007.

area

The New Jersey portion of this area includes the counties of Passaic, Bergen, Morris, Essex, Hudson, Union, Somerset, Middlesex, Mercer, and Monmouth.

The following is a brief summary of the 9-factor analysis for the Northern New Jersey region's air quality.

Factor 1: Air Quality Data

The air quality analysis is an examination of PM_{2.5} air quality monitoring data, including the daily design value calculated for each monitor based on air quality data for a 3-year period.

Violating monitors (based on 2004-2006 design value data) in New Jersey are found in Bergen, Essex, Hudson, and Union Counties.

County	PM _{2.5} 2004-2006 Design Value (µg/m ³)
Orange, NY	28
Rockland, NY	NA
Westchester, NY	34
Bronx, NY	39
Queens, NY	34
Nassau, NY	33
Kings, NY	37
Richmond, NY	34
New York, NY	41
Putnam, NY	No monitor
Dutchess, NY	No monitor
Ulster, NY	No monitor
Sullivan, NY	No monitor
Bergen, NJ	37
Middlesex, NJ	34.0
Monmouth, NJ	No monitor
Essex, NJ	38
Mercer, NJ	34
Hudson, NJ	42.6
Union, NJ	40.9
Morris, NJ	31
Passaic, NJ	35.0
Somerset, NJ	No monitor
Ocean, NJ	31
Hunterdon, NJ	No monitor
Sussex, NY	No monitor
Warren, NJ	34
Fairfield, CT	36
New Haven, CT	38

The 24-hour PM_{2.5} standard is 35 µg/m³.

All counties with design values above the standard have been recommended for nonattainment designation for New Jersey. Middlesex, Mercer, Morris, Passaic, and Warren had design values approaching the standard in New Jersey.

Factor 2: Emissions in the New York and New Jersey Counties included in the NY-NJ-CT Nonattainment Area and adjacent counties

The following table shows total emissions (in tons per year) for New York and New Jersey Counties included in the NY-NJ-CT nonattainment area and adjacent counties.

(Data source: 2002 MANE-VU Modeling Inventory).

County	2002 PM_{2.5} (tons)	Proj 2009 PM_{2.5} (tons)	02-09 % change	2002 SO₂ (tons)	Proj 2009 SO₂ (tons)	02-09 % change	2002 NO_x (tons)	Proj 2009 NO_x (tons)	02-09 % change
Orange, NY	1,523	2,467	62	23,007	24,148	5	20,030	14,272	-29
Rockland, NY	734	1,031	40	10,242	2,086	-80	14,165	9,072	-36
Westchester, NY	1,832	1,796	-2	4,846	4,495	-7	48,464	20,357	-58
Bronx, NY	1,202	1,199	0	3,182	2,952	-7	16,056	11,101	-31
Queens, NY	3,112	2,603	-16	9,614	5,206	-46	42,659	27,580	-35
Kings, NY	2,492	2,398	-4	6,747	4,561	-32	28,296	21,083	-25
Richmond, NY	872	840	-4	2,104	873	-59	10,099	7,607	-25
Nassau, NY	2,432	2,311	-5	5,773	4,691	-19	38,626	24,814	-36
Suffolk, NY	4,729	4,226	-11	50,269	18,682	-63	64,398	39,672	-38
Ulster, NY	1,667	1,596	-4	3,374	3,275	-3	7,526	5,209	-31
Sullivan, NY	916	890	-3	1,007	957	-5	2,658	1,777	-33
New York, NY	3,997	3,785	-5	11,664	8,964	-23	40,284	30,330	-25
Dutchess, NY	1,311	1,274	-3	4,856	4,971	2	9,900	6,597	-33
Putnam, NY	521	478	-8	1,218	1,134	-7	7,268	3,578	-51
Bergen, NJ	1,801	1,698	-6	1,739	1,064	-39	26,840	16,862	-37
Middlesex, NJ	1,977	1,811	-8	2,115	1,239	-41	26,835	16,704	-38
Monmouth, NJ	1,640	1,481	-10	1,669	810	-51	17,925	11,291	-37
Essex, NJ	1,520	1,246	-18	4,316	3,331	-23	24,594	14,123	-43
Mercer, NJ	1,236	1,653	34	15,508	4,270	-72	25,520	9,957	-61
Hudson, NJ	2,002	1,646	-18	21,409	12,064	-44	22,047	10,866	-51
Union, NJ	1,380	1,293	-6	3,503	2,189	-38	18,850	11,746	-38
Morris, NJ	1,663	1,536	-8	1,234	894	-28	15,708	9,586	-39
Passaic, NJ	1,021	930	-9	760	533	-30	9,836	6,019	-39
Somerset, NJ	1,556	1,457	-6	636	416	-35	10,365	6,535	-37
Ocean, NJ	2,256	2,023	-10	1,074	762	-29	10,421	7,300	-30
Hunterdon, NJ	1,168	1,047	-10	613	434	-29	6,613	3,942	-40
Sussex, NJ	1,196	1,111	-7	692	582	-16	3,799	2,495	-34
Warren, NJ	1,031	958	-7	565	464	-18	5,250	3,065	-42
Burlington, NJ	1,893	1,717	-9	3,429	1,314	-62	18,522	12,233	-34

All New Jersey Counties show a significant decrease for PM_{2.5}, SO₂, and NO_x emissions.

Factor 3: Population/ Population density

County	2006 Population	2006 Population Density (population per sq mi)
Orange, NY	376,392	418
Rockland, NY	294,965	1,648
Westchester, NY	949,355	2,133
Bronx, NY	1,361,473	32,393
Queens, NY	2,255,175	20,644
Kings, NY	2,508,820	35,531
Nassau, NY	1,325,662	4,650
Richmond, NY	477,377	7,651
Suffolk, NY	1,469,715	1,556
New York, NY	1,611,581	70,191
Dutchess, NY	295,146	349
Putnam, NY	100,603	415
Sullivan, NY	76,588	76
Ulster, NY	182,742	158
Middlesex, NJ	786,971	2,420
Bergen, NJ	904,037	3,778
Monmouth, NJ	635,285	1,304
Essex, NJ	786,147	6,299
Mercer, NJ	367,605	1,552
Hudson, NJ	601,146	10,000
Union, NJ	531,088	5,073
Morris, NJ	493,160	1,003
Somerset, NJ	324,186	975
Passaic, NJ	497,093	2,644
Ocean, NJ	562,335	803
Hunterdon, NJ	130,783	284
Sussex, NJ	153,384	277
Warren, NJ	110,919	286

US Census Bureau, 2006 Population Estimates, Census 2000, 1990 Census

Due to their large concentrated population and relative land area size, the counties within New Jersey (i.e., Middlesex, Essex, and Hudson counties) are moderately high for this factor (i.e., high population densities, high population relative to the remainder of the nonattainment area and adjacent counties).

Factor 4: Traffic and commuting patterns

County	VMT (Millions)	#Commuters to New York Co.	#Commuters to Bronx Co.	# Commuters to Union Co.	# Commuters to New Haven, CT
Orange, NY	4,696.12	9,610	2,414	147	29
Rockland, NY	2,731.10	17,025	6,245	350	56
Westchester, NY	9,166.01	79,643	27,053	327	343
Bronx, NY	4,720.60	159,664	168,903	586	56
Queens, NY	7,838.83	346,268	18,373	780	138
Kings, NY	4,899.46	341,155	11,365	1,567	112
Nassau, NY	11,919.85	94,485	6,274	187	90
Richmond, NY	,2002.10	53,249	1,095	1,486	11
Putnam, NY	3,084.98	4,416	2,021	30	181
New York, NY	4,378.20	631,132	20,775	967	178
Ulster, NY	2,208.47	1,565	1,565	0	11
Dutchess, NY	3,179.54	3,963	1,085	22	199
Bergen, NJ	9,123.92	61,253	5,353	5,124	74
Middlesex, NJ	8,014.09	25,765	355	26,653	51
Monmouth, NJ	6,229.74	22,425	313	8,319	32
Essex, NJ	5,611.09	28,076	782	24,052	10
Mercer, NJ	2,667.73	5,654	147	1,291	15
Hudson, NJ	2,543.18	58,423	1,214	6,740	23
Union, NJ	4,704.31	16,305	417	113,263	11
Morris, NJ	5,397.82	11,516	268	8,755	15
Somerset, NJ	2,702.02	6,243	87	11,835	14
Passaic, NJ	3,302.32	8,402	473	2,943	5
Ocean, NJ	3,366.62	2,964	115	4,567	13
Hunterdon, NJ	928.70	1,176	7	3,069	0
Sussex, NJ	888.93	1,449	94	967	13
Warren, NJ	1,342.37	562	5	991	0
Sullivan, NY	783.93	829	110	6	0
Fairfield, CT	7,648.71	24,831	1,258	56	21,900
New Haven, CT	6,947.70	1,584	183	23	290,098
Hartford, CT	7,951.25	460	36	11	16,948
New London, CT	3,181.29	126	19	9	1,638

The total Vehicle Miles Traveled (VMT) for 2005 is provided for each county in millions of miles.

The largest number of commuters to counties with violating monitors in New Jersey are from the following counties within New York City: New York, Queens, Kings, and the Bronx. A slightly smaller but still significant number of commuters are also traveling into Middlesex, Bergen, Monmouth, Essex, Hudson, and Union Counties in New Jersey. The remaining counties in New York and New Jersey have low numbers of commuters to counties in the nonattainment area with violating monitors.

Middlesex and Bergen Counties in New Jersey score the highest for VMT when compared to the rest of the nonattainment area and adjacent counties.

Factor 5: Expected growth

County	2005 Population	2006 Population	% Population Growth 2005-2006
Orange, NY	372,750	376,392	1.0
Rockland, NY	294,636	294,965	0.1
Westchester, NY	947,719	949,355	0.2
Bronx, NY	1,364,566	1,361,473	-0.2
Queens, NY	2,256,576	2,255,175	-0.1
Kings, NY	2,511,408	2,508,820	-0.1
Nassau, NY	1,331,620	1,325,662	-0.4
Richmond, NY	475,014	477,377	0.5
Suffolk, NY	1,472,086	1,469,715	-0.2
New York, NY	1,606,275	1,611,581	0.3
Ulster, NY	182,433	182,742	0.2
Dutchess, NY	294,509	295,146	0.2
Putnam, NY	100,528	100,603	0.1
Sullivan, NY	76,155	76,588	0.6
Middlesex, NJ	789,283	786,971	-0.3
Passaic, NJ	496,985	497,093	-
Bergen, NJ	902,308	904,037	0.2
Monmouth, NJ	634,841	635,285	0.1
Essex, NJ	789,166	786,147	-0.4
Mercer, NJ	366,070	367,605	0.4
Hudson, NJ	602,970	601,146	-0.3
Union, NJ	530,710	531,088	0.1
Morris, NJ	490,084	493,160	0.6
Somerset, NJ	319,830	324,186	1.4
Ocean, NJ	558,170	562,335	0.7
Hunterdon, NJ	130,042	130,783	0.6
Sussex, NJ	152,726	153,384	0.4
Warren, NJ	110,317	110,919	0.5

U.S. Census Bureau, Annual Population Change

Based upon an analysis of this factor, Somerset County has been identified as experiencing either significant recent growth on a percentage basis. Middlesex, Monmouth, Hudson, Morris, Hunterdon, Sussex, and Warren Counties experienced moderate growth. The remaining counties have very low growth.

Factor 6: Meteorology

The prevailing wind direction to counties with violating monitors is predominantly from the northwest, southwest, and northeast.

County	Prevailing Wind Direction %			
	NW	SW	SE	NE
New York, NY	34	29	11	26
Bronx, NY	33	30	12	25
Union, NJ	31	32	14	23
New Haven, CT	34	30	13	24

Factor 7: Geography/topography

The area does not have any geographical or topographical boundaries limiting its airshed in the areas.

Factor 8: Jurisdictional boundaries

Although this factor is considered as part of the analysis, this factor is not a dominant factor in the decision making process. This area includes Passaic, Bergen, Morris, Essex, Hudson, Somerset, Unions, Middlesex, Mercer, and Monmouth counties in New Jersey, Orange, Rockland, Westchester, Bronx, Queens, Kings, Richmond, Suffolk, and Nassau Counties in New York, and Fairfield and New Haven Counties in Connecticut.

Factor 9: Level of control of emission sources

This factor does not play a significant role in the decision making process. The level of control of emission sources is reflected in factor 1.

Emissions of direct PM_{2.5}, NO_x, and SO₂ will continue to decrease in the future because the implementation of the Clean Air Interstate Rule and additional rules regulating the emissions of NO_x and VOCs that the New Jersey Department of Environmental Protection is planning to propose in 2007.

Easton nonattainment area and adjacent counties.

The New Jersey portion of this area includes Warren County and adjacent counties of Sussex, Hunterdon, and Morris Counties. Based on the 2004-2006-design value in New Jersey, Warren County's monitor is 33.8 $\mu\text{g}/\text{m}^3$ and located in Phillipsburg.

Factor 1: Air Quality Data

The air quality analysis is an examination of $\text{PM}_{2.5}$ air quality monitoring data, including the daily design value calculated for each monitor based on air quality data for a 3-year period.

County	$\text{PM}_{2.5}$ 2004- 2006 Design Value ($\mu\text{g}/\text{m}^3$)
Northampton, PA	36.6
Lehigh, PA	Monitor was shut down in 2006
Berks, PA	37.3
Schuylkill, PA	No Monitor
Carbon, PA	No Monitor
Monroe, PA	No Monitor
Bucks, PA	33.2
Hunterdon, NJ	No Monitor
Sussex, NJ	No Monitor
Morris, NJ	31.5
Warren, NJ	33.8

The 24-hour $\text{PM}_{2.5}$ standard is 35 $\mu\text{g}/\text{m}^3$.

Pennsylvania's Northampton and Berks County have a violating monitor whereas Warren County and Morris County monitors are slightly below the 24-hour standard.

As a condition of an October 31, 2001 Administrative Consent Order between Roche Vitamins Inc. and the New Jersey Department of Environmental Protection (NJDEP), a supplemental environmental project was implemented to establish an ambient air monitoring program in the vicinity of the Town of Belvidere and White Township in Warren County, New Jersey. The program was called the Warren County Air Monitoring Program (WCAMP), monitored the air for levels of sulfur dioxide (SO_2), fine particulate matter ($\text{PM}_{2.5}$), mercury, selected volatile organic compounds and specified meteorological parameters. The primary purpose of the WCAMP was to obtain and report air quality information from Belvidere and surrounding areas.

The WCAMP began operation in October 2002 and achieved full operation in December 2002. Data generated by this program was sent to the DSM CAP and the Warren-Northampton Regional Air Quality Advisory Panel, or AIRQAP, for review, and posted on AIRQAP's website for review by the public. This data has helped greatly in characterizing the extent to which the region is in compliance with National Ambient Air Quality Standards (NAAQS) for sulfur dioxide and fine particles and with New Jersey's health-based benchmarks for volatile organic compounds. Although there were 24-hour averages that exceeded the current 35 $\mu\text{g}/\text{m}^3$ standard the 98th percentile value was 31.8 $\mu\text{g}/\text{m}^3$ and 32.8 $\mu\text{g}/\text{m}^3$ for 2003 and 2004, respectively.

Factor 2: Emissions in Allentown-Bethlehem-Easton nonattainment area, Warren County and adjacent counties in Pennsylvania and New Jersey.

The following table shows total 2002 emissions (in tons per year) and projected 2009 emissions for Pennsylvania's Northampton, Lehigh, Berks, Schuylkill, Carbon, Monroe, and Bucks counties. New Jersey's counties are Warren, Hunterdon, Sussex, and Morris.

(Data source: 2002 MANE-VU Modeling Inventory)

County	2002 PM _{2.5} (tons)	Proj 2009 PM _{2.5} (tons)	02-09 % change	2002 SO ₂ (tons)	Proj 2009 SO ₂ (tons)	02-09 % change	2002 NO _x (tons)	Proj 2009 NO _x (tons)	02-09 % change
Northampton, PA	2,995.62	6,340	112	58,796.58	39,973	-32	24,518.02	6,340	-74
Lehigh, PA	1,510.82	1,568	4	3,761.99	3,796	1	14,525.00	9,589	-34
Berks, PA	2833	3949	39	17593	12843	-27	22221	15638	-30
Schuylkill, PA	1245	1371	10	7271	17368	139	8701	6981	-20
Carbon, PA	617	727	18	1465	2012	37	4460	3542	-21
Monroe, PA	1192	1279	7	1084	902	-17	7675	5280	-31
Bucks, PA	2170.35	2158	-1	3837.34	3588	-6	20195.10	14400	-29
Hunterdon, NJ	1167.93	1047	-10	613.34	434	-29	6612.99	3942	-40
Sussex, NJ	1196.31	1111	-7	691.84	582	-16	3799.29	2495	-34
Morris, NJ	1663.40	1536	-8	1234.39	894	-28	15708.30	9586	-39
Warren, NJ	1,030.96	958	-7	565.44	464	-18	5,250.16	3,065	-42

The projected 2009 PM_{2.5} emissions show that all the Pennsylvania counties with the exception of Bucks County have increasing emissions whereas all New Jersey Counties have a decrease in emissions.

Factor 3: Population/Population density

County	2006 Population	2006 Population Density (population per sq mi)
Northampton, PA	291,306	714
Lehigh, PA	335,544	899
Berks, PA	401,149	435
Schuylkill, PA	147,405	Not available
Carbon, PA	62,567	Not available
Monroe, PA	165,685	Not available
Bucks, PA	623,205	985
Hunterdon, NJ	130,783	284
Sussex, NJ	153,384	277
Morris, NJ	493,160	1,003
Warren, NJ	110,919	286

US Census Bureau, [2006 Population Estimates](#), Census 2000, 1990 Census

Factor 4: Traffic and commuting patterns

County	VMT (Millions)	# of Commuters to Northampton, PA	# of Commuters to Lehigh, PA	# of Commuters to Warren, PA	# of Commuters to Hunterdon	# of Commuters to Somerset	# of Commuters to Morris
Northampton, PA	2399.15	68,449 (54)	30,180 (24)	7,192 (6)	3,879 (3)	2,376 (2)	1,515 (1)
Lehigh, PA	3374.14	18,040 (12)	110,302 (75)	Less than 1%	Less than 1%	Less than 1%	Less than 1%
Berks, PA	3320.25	Less than 1% if any	6,538 (4)	Less than 1% if any	Less than 1% if any	Less than 1% if any	Less than 1% if any
Schuylkill, PA	1353.08	Less than 1% if any	1,742 (3)	Less than 1% if any	Less than 1% if any	Less than 1% if any	Less than 1% if any
Carbon, PA	698.90	Less than 1% if any	Less than 1% if any	Less than 1% if any	Less than 1% if any	Less than 1% if any	Less than 1% if any
Monroe, PA	1555.69	3,467 (6)	1,618 (3)	1,359 (2)	Less than 1% if any	Less than 1% if any	3,329 (5)
Bucks, PA	1669.59	1,975 (8)	4,663 (18)	Less than 1% if any	Less than 1% if any	Less than 1% if any	Less than 1% if any
Hunterdon, NJ	928.70	Less than 1% if any	Less than 1% if any	1,145 (2)	25,761 (41)	12,983 (21)	3,656 (6)
Sussex, NJ	888.93	Less than 1% if any	Less than 1% if any	1,410 (2)	Less than 1% if any	955 (1)	20,398 (28)
Morris, NJ	5397.82	Less than 1% if any	Less than 1% if any	Less than 1% if any	Less than 1% if any	8,954 (4)	138,737 (58)

Warren County workforce commuting within New Jersey

County	VMT (Millions)	# of Commuters within Warren Co. (% of workforce)	# of Commuters to Morris Co (% of workforce)	# of Commuters to Hunterdon Co (% of workforce)	# of Commuters to Somerset Co. (% of workforce)	# of Commuters to Essex Co (% of workforce)	# of Commuters to Middlesex Co (% of workforce)
Warren, NJ	1342.37	21,034 (42)	9,273 (18)	5,326 (11)	3,653 (7)	1,379 (3)	1,366 (3)

Warren County Workforce commuting outside of New Jersey

County	# of Commuters to Northampton Co. (% of workforce)	# of Commuters to Lehigh Co. (% of workforce)	# of Commuters to New York Co. (% of workforce)
Warren, NJ	1,803 (4)	602 (1)	562 (1)

Commuting patterns do not seem to affect Warren County. The majority of the workforce in Warren County stays within county borders. A small number of commuters come from outside of Warren County.

Factor 5: Expected Growth

County	2005 Population	2006 Population	% Growth 2005-2006
Northampton, PA	287,334	291,306	13
Lehigh, PA	330,168	335,544	11
Berks, PA	396,236	401,149	9
Schuylkill, PA	146,996	147,405	22
Carbon, PA	61,876	62,567	40
Monroe, PA	162,415	165,685	21
Bucks, PA	619,772	623,205	4
Hunterdon, NJ	130,042	130,783	0.6
Sussex, NJ	152,726	153,384	0.4
Morris, NJ	490,084	493,160	0.6
Warren, NJ	110,317	110,919	0.5

U.S. Census Bureau, Annual Population Change

Warren County along with the rest of the New Jersey counties shows low percentage of growth.

Factor 6: Meteorology

The prevailing wind direction to counties with violating monitors is predominantly from the NW and SW.

County	Prevailing Wind Direction %			
	NW	SW	SE	NE
Northampton, PA				
Lehigh, PA				
Warren, NJ				

Factor 7: Geography/topography

The high terrain in the river valley in Warren County contributes to higher emission concentrations in localized areas.

Factor 8: Jurisdictional boundaries

New Jersey is considering recommending all of Warren County or the municipality of Knowlton, Warren County to be included in the Allentown-Bethlehem-Easton nonattainment area. Belvidere and White Township, in Warren County are not being recommended for the inclusion on this nonattainment area based on the monitoring that was conducted as a result of the October 2001 Administrative Consent Order as discussed above in factor 1, air quality data.

Factor 9: Level of control of emission sources

This factor did not play a significant role in the decision making. The level of control of emissions is reflected in factor 1.

Emissions of direct PM_{2.5}, NO_x, and SO₂ will continue to decrease in the future because the implementation of the Clean Air Interstate Rule and additional rules regulating the emissions of NO_x and VOCs that the New Jersey Department of Environmental Protection is planning to propose in 2007.